PATENT SPECIFICATION

DRAWINGS ATTACHED

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884,529

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International Classification:—F06k.

COMPLETE SPECIFICATION

Improvements in or relating to Fluid Valves

We, BELL'S ASBESTOS AND ENGINEERING LIMITED, of Bestobell Works, Slough, Buckinghamshire, a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to fluid valves and in particular to stop valves and non-return valves having a resilient sealing member for engagement with a valve seating and a further part for simultaneous movement with the resilient sealing member to act as a stop and limit the amount of closure of the valve.

It has previously been proposed to provide a stop valve having a resilient sealing member for engagement with a valve seating in which the resilient sealing member has associated therewith a metallic annulus having a peripheral depending flange. The resilient sealing member extends for a greater depth than the peripheral flange so that when the valve is closed only a limited amount of deformation of the resilient sealing member will take place, due to the peripheral flange engaging part of the valve seating. It has also been proposed to so shape and dimension the resilient sealing member in conjunction with the metallic annulus that the valve is fully closed deformation of the resilient sealing member has taken place to such an extent to completely or partly fill the annulus. This ensures that a good seal is achieved. One of the disadvantages with these prior proposals has been that fluid pressure on the input side of the valve is constantly acting against the resilient sealing member when the valve is closed with consequent rapid deterioriation in the sealing member and a reduction in its effectiveness.

It is the main object of this invention to provide a valve which overcomes the above disadvantage in a simple manner.

According to the present invention there is provided a fluid valve having two co-operating closure parts, one said part carrying a toroidal shaped resilient sealing member for engagement with the other said part in the form of a valve seating, said sealing member surrounding a central portion having its lower edge chamfered and lying within a depending flange which forms part of a metal annulus having its inner lower edge chamfered so that both the central portion and the depending flange are capable of simultaneous co-operation with chamfered or inclined surfaces on the valve seating, the sealing member being located within an annular groove the side walls of which are formed by the central portion and depending flange.

Said central portion may form part of the movable valve member and be of frusto-conical formation so as to retain the resilient sealing member in position.

It will be appreciated that with a valve constructed as described above and when closing the valve, the resilient sealing member will first engage the valve seating and will be deformed until the central portion and depending flange abut against the valve seating. The degree of deformation of the resilient member is limited and as soon as the valve is fully closed the second and third seals provided by the central portion and depending flange, which are in metal-to-metal contact with the seating, shield the resilient sealing member from the fluid or line service thus prolonging the life and effectiveness of the resilient sealing member.

In order that the invention may readily be carried into effect one embodiment thereof will now be described by way of example only with reference to the accompanying drawings in which:—

Fig. 1 is a cross-sectional view of a fluid valve constructed according to the invention; and

Fig. 2 is a fragmentary cross-sectional view of part of the fluid valve shown in Fig. 1.

In the preferred form of the invention shown in the drawings, a fluid valve is provided of basically conventional design having two co-operating closure parts generally designated at 1 and 2, the part 1 being the movable member and the other part 2 being the fixed valve seating. The fixed valve seating 2 has a flat upper seating surface 3 and two chamfered edges 4 and 5 which provide additional seating surfaces. The movable valve member 1 includes a central portion 6 of frusto-conical shape which has its lower edge chamfered at 7 for engagement with inclined edge 5 of valve seating 2. This central portion 6 is provided with a shank 8 for mounting the central portion within the valve.

Mounted on this shank 8 is a metallic annulus 9 having a depending peripheral flange 10, the lower edge of this flange 10 being chamfered at 11 for engagement with inclined edge 4 of valve seating 2. Located between the central portion 6 and peripheral flange 10 is a toroidal shaped resilient sealing member 12 which may be of rubber, plastics or any other suitable material, and which is retained within the annular groove 13 formed by the side walls of central portion 6 and peripheral flange 10.

On closing the valve, firstly the resilient sealing ring 12 will abut against the upper surface 3 of the valve seating and form a first seal, whereupon on further closure of the valve the ring 12 will be deformed and allow the inner and outer rings 6 and 10 to bear upon the inclined edges 4 and 5 of the valve seating, thus forming two further seals.

A valve constructed as above ensures that the resilient sealing ring is not unduly distored upon closing the valve; ensures that a good seal is obtained and protects the resilient sealing ring from the line service. A resilient sealing ring used in this manner has practically no wear and a correspondingly increased life.

WHAT WE CLAIM IS:—

1. A fluid valve having two co-operating closure parts, one said part carrying a toroidal shaped resilient sealing member for engagement with other said part in the form of a valve seating, said sealing member surrounding a central portion having its lower edge chamfered and lying within a dending flange which forms part of a metal annulus having its inner lower edge chamfered so that both the central portion and the depending flange are capable of simultaneous co-operation with chamfered or inclined surfaces on the valve seating, the sealing member being located within an annular groove the side walls of which are formed by the central portion and depending flange.

2. A fluid valve as claimed in Claim 1, in which said central portion forms part of the movable valve member and is of frusto-conical formation so as to retain the resilient sealing member in position.

3. A fluid valve substantially as illustrated in Fig. 1 of the accompanying drawing with reference to the description thereof.

4. In a fluid pipe line, a valve as claimed in any one of the preceding claims.

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PROVISIONAL SPECIFICATION

Improvements in or relating to Fluid Valves

We, BELL'S ASBESTOS AND ENGINEERING LIMITED, of Bestobell Works, Slough, Buckinghamshire, a British Company, do hereby declare this invention to be described in the following statement:—

This invention relates to valves and in particular to stop valves and non-return valves having a resilient sealing member for engagement with a valve seating and a further part for simultaneous movement with the resilient sealing member to act as a stop and limit the amount of closure of the valve.

It has previously been proposed to provide a stop valve having a resilient sealing member for engagement with a valve seating, in which the resilient sealing member has associated therewith a metallic annulus having a peripheral depending flange. The resilient sealing member extends for a greater depth than the peripheral flange so that when the valve is closed only a limited amount of deformation of the resilient sealing member will take place, due to the peripheral flange engaging part of the valve seating. It has also been proposed to so shape and dimension the resilient sealing member in conjunction with the metallic annulus, that when the valve is fully closed deformation of the resilient sealing member has taken place to such an extent to completely fill the annulus. This ensures that a good seal is achieved. One of the disadvantages with these prior proposals has been that fluid pressure on the input side of the valve is constantly acting against the resilient sealing member when the valve is closed with consequent rapid deterioration in the sealing member and a reduction in its effectiveness.

It is the main object of this invention to provide a valve which overcomes the above disadvantages in a simple manner.

According to the present invention there is provided a valve having two co-operation closure parts, one said part carrying a toroidal shaped resilient sealing member for engagement with a valve seating, said sealing member being retained in position by and surrounding a stop which, upon closing the valve, engages part of the valve seating and thereby limits the deformation of the sealing member. Said stop may form part of the movable valve member and be of frusto-conical formation, so as to retain the resilient sealing member in position by the inherent resilience of the member. The lower peripheral edge of the stop may be chamfered for engagement with a correspondingly chamfered or inclined inner edge of the valve seating, these two chamfered edges when in contact forming a second seal for the valve.

It will be appreciated that a valve constructed as described above forms in effect a double seal and when closing the valve, the resilient sealing member will first engage the valve seating and will be deformed until the stop abuts part of the valve seating. Thus, the degree of deformation of the resilient sealing member is limited. Once the valve is fully closed the second seal, which is by metal-to-metal contact, shields the seal between the resilient sealing member and the valve seating from the fluid or line service thus prolonging the life and effectiveness of the resilient sealing member.

In a further feature of the invention the toroidal shaped resilient member is located around a stop of frusto-conical formation and surrounding the resilient member is provided a depending flange which forms a part of a metal annulus so that, in effect, the resilient sealing member is located within an annular groove, the side walls of which are formed by the depending flange and the stop. The inner lower edge of the depending flange may be chamfered so as to co-operate with a chamfered edge or inclined surface of the outer edge of the valve seating thus forming a third seal for the valve. The arangement may be such that both the stop and the depending flange engage the valve seating simultaneously, both providing metal-to-metal seals.

In a preferred form of the invention, a valve is provided of conventional design having two co-operating closure parts, one of which is a moveable member and the second of which is a fixed valve seating. The fixed valve seating has a flat seating face and two chamfered edges which provide additional sealing surfaces. The movable valve member includes an inner ring of frusto-conical shape which forms a stop and has its lower edge chamfered for engagement with one of the inclined edges of the valve seating. This inner ring is provided with a shank for mounting same within the valve. Surrounding this shank is a valve outer ring which comprises a metallic annulus having a depending peripheral flange, the lower inner edge of this flange being chamfered for engagement with the other inclined edge of the valve seating. Located between the inner and outer rings is a toroidal shaped resilient sealing member in the form of a ring which may be of rubber, plastics or any other suitable material, and which is retained within the groove formed by the inner and outer rings by the inherent resilience of this sealing member. Thus, upon closing the valve, firstly the resilient sealing ring will abut the upper face of the valve seating and form a first seal, whereupon on further closure of the valve the ring will be deformed and allow the inner and outer rings to bear upon the inclined faces of the valve seating, thus forming two further seals.

A valve constructed as above ensures that the resilient sealing ring is not unduly distorted upon closing the valves; ensures that a good seal is obtained and protects the resilient sealing ring from the line service. A resilient sealing ring used in this manner has practically no wear and a correspondingly increased life.

The construction of the valve may be modified as desired within the scope of the invention, for example, the various subsidiary sealing faces may not be inclined, but may be formed as directly abutting faces.

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884,529 COMPLETE SPECIFICATION
1 SHEET
This drawing is a reproduction of the Original on a reduced scale.

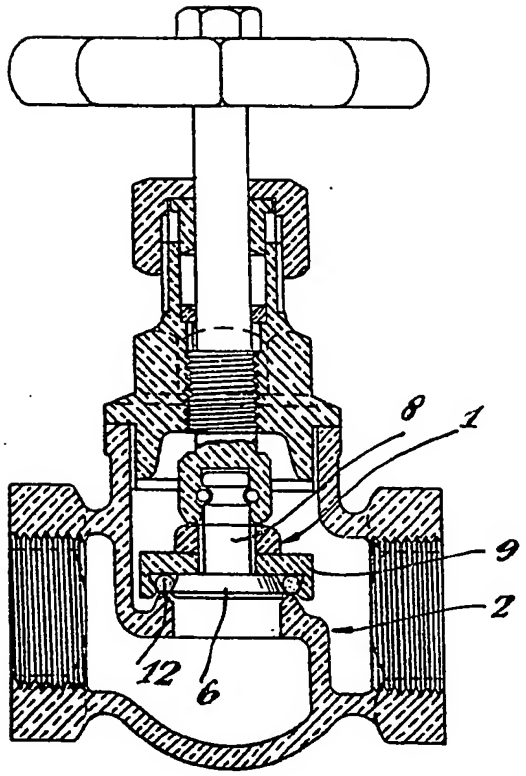

Fig. 1.

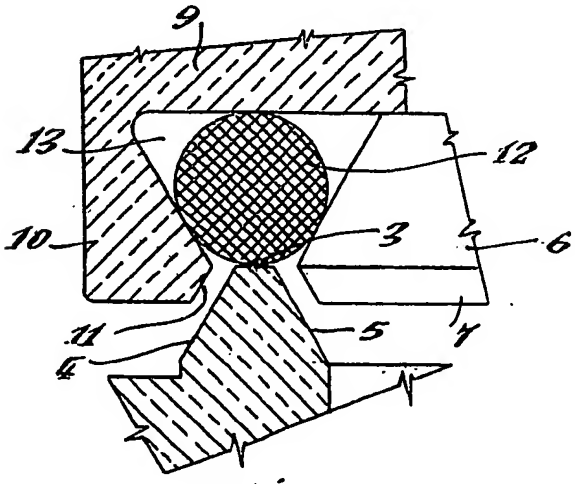

Fig. 2.